Tech

2 4 1927

Transactions
of
American Society for Steel Treating

Volume XII

July, 1927—December, 1927

Published by
American Society for Steel Treating
7016 Euclid Avenue
Cleveland

THE NEW YORK
PUBLIC LIBRARY
356004A
ASTOR, LENOX AND
TILDEN FOUNDATIONS
R 1928 L

INDEX

TRANSACTIONS

OF

AMERICAN SOCIETY FOR STEEL TREATING

VOLUME XII

July, 1927—December, 1927

RAY T. BAYLESS, *Editor*

July 1-168
August 169-336
September 337-528
October 529-688
November 689-852
December 853-1020

INDEX OF AUTHORS

Volume XII

Transactions of American Society for Steel Treating

July, 1927—December, 1927

B

Barry, R. K. 630

C

Chu-Phay, Yap 601
Coyle, Francis B. 446

D

Davis, E. F. 291
Dillon, H. J. 905
Dowdell, Ralph L. 51

E

Eaton, G. M. 794
Egeberg, Birger 46
Enos, George M. 976
Epstein, S. 337

F

Fishel, W. P. 982
French, H. J. 921
Frost, E. R. 954

G

Gat, John D. 376
Guthrie, R. G. 853

H

Harder, Oscar E. 51, 436
Herschman, H. K. 921
Howard, James E. 622

J

Jasper, T. McLean 466
Jeffries, Dr. Zay 871
Jordan, L. 3

K

Kelley, G. L. 635
Keshian, H. G. 689
Kinzel, A. B. 778
Kjerrman, Bengt 41, 759
Knowlton, H. B. 106, 479, 814

M

Mahin, E. G. 905
Merten, W. J. 195
Moore, R. R. 968

N

Northrup, H. B. 470

P

Priester, G. C. 436

Q

Quick, G. W. 3

R

Rawdon, H. S. 337
Romig, Orlando E. 235
Roth, E. L. 27

S

Sisco, F. T. 279, 651
Strauss, Jerome 69, 239
Sutton, Roger 221
Sykes, W. P. 737, 871

V

Vanick, J. S. 169

W

Whetzel, J. C. 235
Whiteley, J. H. 208
Winlock, Joseph 635
Wozasek, Dr. O. J. 853

INDEX OF SUBJECTS AND AUTHORS OF PAPERS

VOLUME XII

TRANSACTIONS OF AMERICAN SOCIETY FOR STEEL TREATING

July, 1927—December, 1927

A

Abnormal Steel; Progress in Study of Normal and—
S. Epstein and H. S. Rawdon 337
Address; The President's Annual 545
Alloy for Brinell Balls; Iron-Carbon-Vanadium—
G. W. Quick and L. Jordan 3
Alloys; A Study of Some of the Causes of Failure in Heat Resisting—
Roger Sutton 221
Aluminum Bronze—Part I—*Jerome Strauss* 69
Aluminum Bronze—Part II—*Jerome Strauss* 239
Aluminum Oxide for Final Polishing and the Preservation of Polished and Etched Surfaces; Preparation of—*W. P. Fishel* 982
Ammonia; Deterioration of Structural Steel in the Synthesis of—
J. S. Vanick 169
Annual Address; The President's 545
Annual Banquet 571
Annual Convention; The Ninth 512
Annual Convention and Exposition 539
Annual Report; The Secretary's 549
Annual Report; The Treasurer's 561
Application to Industry; The Development of Scientific Research and its—
T. McLean Jasper 466
Applied to Iron and Steel; A Critical Study of the Bend Test as—
A. B. Kinzel 778
Austenitic Structure in Steels; The Decomposition of the—Part VI—
Oscar E. Harder and Ralph L. Dowdell 51
Automobile Body Sheet Steel; Testing—
Joseph Winlock and G. L. Kelley 635

B

Ball Bearing Steels; Heat Treatment of Two—*Bengt Kjerrman* 759
Balls; Iron-Carbon-Vanadium Alloy or Brinell—
G. W. Quick and L. Jordan 3
Banquet; The Annual 571
Baths of Low Cyanide Concentration; Case Carburization of Production Steel by Means of Salt—*H. B. Northrup* 470
Bearing Steels; Heat Treatment of Two Ball—*Bengt Kjerrman* 759
Bend Test as Applied to Iron and Steel; A Criteial Study of the—
A. B. Kinzel 778

Bend Tests on High Speed Steel; Comparisons of Impact and Slow—
R. K. Barry 630
Blades; Wear Resistance of Cutting Edges of Blanking Dies and Shear—
W. J. Merten 195
Blanking Dies and Shear Blades; Wear Resistance of Cutting Edges of—
W. J. Merten 195
Body Sheet Steel; Testing Automobile—
Joseph Winlock and G. L. Kelley 635
Brinell and Scleroscope Numbers; Relationships Between Rockwell—
R. R. Moore 968
Brinell Balls; Iron-Carbon-Vanadium Alloy for—
G. W. Quick and L. Jordan 3
Bronze; Aluminum—Part I—*Jerome Strauss* 69
Bronze; Aluminum—Part II—*Jerome Strauss* 239

C

Carbon Distribution in Steel; Segregation of Dissolved Elements and Its Influence upon—*E. G. Mahin and H. J. Dillon* 905
Carbon in Gray Cast Iron; Effect of Heat Treatment on the Combined —*E. L. Roth* 27
Carbon-Vanadium Alloy for Brinell Balls; Iron—
G. W. Quick and L. Jordan 3
Carburization of Production Steels by Means of Salt Baths of Low Cyanide Concentration; Case—*H. B. Northrup* 470
Carburization of Steel, Gas—*R. G. Guthrie and Dr. O. J. Wozasek* 853
Carburizing Iron by Mixtures of Hydrogen and Methane—
W. P. Sykes 737
Case Carburization of Production Steels by Means of Salt Baths of Low Cyanide Concentration—*H. B. Northrup* 470
Cast Iron; The Constitution of Steel and—Part X—*F. T. Sisco* 279
Cast Iron; The Constitution of Steel and—Section II—Part I—
F. T. Sisco 651
Cast Iron; Effect of Heat Treatment on the Combined Carbon in Gray,—
E. L. Roth 27
Cast Iron for Diesel Engines; Properties and Heat Treatment of—
Francis B. Coyle 446
Causes of Failure in Heat Resisting Alloys; A Study of Some of the—
Roger Sutton 221
Chapters; News of the 143, 332, 528, 679, 841, 1007
Combined Carbon in Gray Cast Iron; Effect of Heat Treatment on the—
E. L. Roth 27
Comment and Discussion 827
Comments on the Convention and Exposition; Press 535
Comparisons of Impact and Slow Bend Tests on High Speed Steel—
R. K. Barry 630
Concentration; Case Carburization of Production Steels by Means of Salt Baths of Low Cyanide—*H. B. Northrup* 470
Concerning Steel and Heat Treatment; Facts and Principles—Part XIII —*H. B. Knowlton* 106
Concerning Steel and Heat Treatment; Facts and Principles—Part XIV —*H. B. Knowlton* 479

Concerning Steel and Heat Treatment; Facts and Principles—Part XV—
H. B. Knowlton 814
Constitution and Properties of Hardened Steel; On the—
W. P. Sykes and Dr. Zay Jeffries 871
Constitution of Steel and Cast Iron—Part X—*F. T. Sisco* 279
Constitution of Steel and Cast Iron, Section II—Part I—
F. T. Sisco 651
Convention; The Ninth Annual 512
Convention and Exposition; The Annual 539
Convention and Exposition; Press Comments on the 535
Cracks in Steel Rails; Hair—*J. H. Whiteley* 208
Critical Study of the Bend Test as Applied to Iron and Steel—
A. B. Kinzel 778
Cutting Edges of Blanking Dies and Shear Blades; Wear Resistance of—
W. J. Merten 195
Cyanide Concentration; Case Carburization of Production Steels by Means of Salt Baths of Low—*H. B. Northrup* 470

D

Decomposition of the Austenitic Structure in Steels—Part VI—
Oscar E. Harder and Ralph L. Dowdell 51
Deep Etch Test for Iron and Steel—*H. G. Keshian* 689
Deep Piercing; Forging Machine Die Design for—*E. R. Frost* 954
Design for Deep Piercing; Forging Machine Die—*E. R. Frost* 954
Design from the Heat Treating Standpoint—*G. M. Eaton* 794
Deterioration of Structural Steel in the Synthesis of Ammonia—
J. S. Vanick 169
Determining the Proportional Limit of Steel—*Bengt Kjerrman* 41
Development of Scientific Research and Its Application to Industry—
T. McLean Jasper 466
Die Design for Deep Piercing; Forging Machine—*E. R. Frost* 954
Diesel Engines; Properties and Heat Treatment of Cast Iron for—
Francis B. Coyle 446
Discussion; Comment and 827
Discussion; Normality of Steel and General—*John D. Gat* 376
Dissolved Elements and Its Influence upon Carbon Distribution in Steel; Segregation of—*E. G. Mahin and H. J. Dillon* 905
Distribution in Steel; Segregation of Dissolved Elements and Its Influence upon Carbon—*E. G. Mahin and H. J. Dillon* 905

E

Edges of Blanking Dies and Shear Blades; Wear Resistance of Cutting—
W. J. Merten 195
Effect of Heat Treatment on the Combined Carbon in Gray Cast Iron—
E. L. Roth 27
Effect of Temperature on the Mechanical and Microscopic Properties of Steel—*G. C. Priester and O. E. Harder* 436
Elements and Its Influence upon Carbon Distribution in Steel; Segregation of Dissolved—*E. G. Mahin and H. J. Dillon* 905
Engineering Index 129, 311, 496, 671, 834, 980

Engines; Properties and Heat Treatment of Cast Iron for Diesel—
Francis B. Coyle 446
Etch Test for Iron and Steel; Deep—*H. G. Keshian* 689
Etched Surfaces; Preparation of Aluminum Oxide for Final Polishing
and the Preservation of Polished and —*W. P. Fishel* 982
Experiments Relating to the Wear of Plug Gages; Recent—
H. J. French and H. K. Herschman 921
Exposition; The Annual Convention and 539
Exposition; Press Comments on the Convention and 535

F

Facts and Principles Concerning Steel and Heat Treatment—Part XIII
—*H. B. Knowlton* 106
Facts and Principles Concerning Steel and Heat Treatment—Part XIV—
H. B. Knowlton 479
Facts and Principles Concerning Steel and Heat Treatment—Part XV—
H. B. Knowlton 814
Failure in Heat Resisting Alloys; A Study of Some of the Causes of—
Roger Sutton 221
Final Polishing and the Preservation of Polished and Etched Surfaces;
Preparation of Aluminum Oxide for—*W. P. Fishel* 982
Forging Machine Die Design for Deep Piercing—*E. R. Frost* 954
Furnaces and Heat Treating Methods; Modern—*E. F. Davis* 291

G

Gages; Recent Experiments Relating to the Wear of Plug—
H. J. French and H. K. Herschman 921
Gas Carburization of Steel—*R. G. Guthrie and Dr. O. J. Wozasek* 853
General Discussion; Normality of Steel and—*John D. Gat* 376
Gray Cast Iron; Effect of Heat Treatment on the Combined Carbon in—
E. L. Roth 27
Growth in Mild Steels; On Grain—Yap Chu-Phay 601

H

Hair Cracks in Steel Rails—*J. H. Whiteley* 208
Hardened Steel; On the Constitution and Properties of—
W. P. Sykes and Dr. Zay Jeffries 871
Heat Resisting Alloys; A Study of Some of the Causes of Failure in
—*Roger Sutton* 221
Heat Treating Methods; Modern Furnaces and—*E. F. Davis* 291
Heat Treating Standpoint; Design from the—*G. M. Eaton* 794
Heat Treatment; A Neglected Phenomenon in—*Birger Egeberg* 46
Heat Treatment; Facts and Principles Concerning Steel and—Part XIII
—*H. B. Knowlton* 106
Heat Treatment; Facts and Principles Concerning Steel and—Part
XIV—*H. B. Knowlton* 479
Heat Treatment; Facts and Principles Concerning Steel and—Part XV
—*H. B. Knowlton* 814
Heat Treatment of Cast Iron for Diesel Engines; Properties and—
Francis B. Coyle 446

Heat Treatment of Two Ball Bearing Steels—*Bengt Kjerrman* 759
Heat Treatment on the Combined Carbon in Gray Cast Iron; Effect of—
E. L. Roth 27
High Speed Steel; Comparisons of Impact and Slow Bend Tests on—
R. K. Barry 630
Hydrogen and Methane; Carburizing Iron by Mixtures of—*W. P. Sykes* . 737

I

Impact and Slow Bend Tests on High Speed Steel; Comparisons of—
R. K. Barry 630
Index; Engineering 129, 311, 496, 671, 834, 980
Industry; The Development of Scientific Research and its Application to—
T. McLean Jasper 466
Industry in 1926; Iron 303
Influence upon Carbon Distribution in Steel; Segregation of Dissolved Elements and Its—*E. G. Mahin and H. J. Dillon* 905
Iron; The Constitution of Steel and Cast—Part X—*F. T. Sisco* 279
Iron; The Constitution of Steel and Cast, Section II—Part I—
F. T. Sisco 651
Iron; Effect of Heat Treatment on the Combined Carbon in Gray Cast—
E. L. Roth 27
Iron and Steel; A Critical Study of the Bend Test as Applied to—
A. B. Kinzel 778
Iron and Steel; Deep Etch Test for—*H. G. Keshian* 689
Iron by Mixtures of Hydrogen and Methane; Carburizing—*W. P. Sykes*.. 737
Iron-Carbon-Vanadium Alloy for Brinell Balls—
G. W. Quick and L. Jordan 3
Iron for Diesel Engines; Properties and Heat Treatment of Cast—
Francis B. Coyle 446
Iron Industry in 1926 303

L

Low Cyanide Concentration; Case Carburization of Production Steels by Means of Salt Baths of—*H. B. Northrup* 470
Limit of Steel; Determining the Proportional—*Bengt Kjerrman* 41

M

Machine; A Metallographic Polishing—
Orlando E. Romig and J. C. Whetzel 235
Machine Die Design for Deep Piercing; Forging—*E. R. Frost* 954
Mechanical and Microscopic Properties of Steel; Effect of Temperature on the—G. C. Priester and O. E. Harder 436
Metallographic Polishing Machine—
Orlando E. Romig and J. C. Whetzel 235
Methane; Carburizing Iron by Mixtures of Hydrogen and—
W. P. Sykes 737
Methods; Modern Furnaces and Heat Treating—*E. F. Davis* 291
Mild Steels; On Grain Growth in—Yap Chu-Phay 601
Miscroscopic Properties of Steel; Effect of Temperature on the Mechanical and—*G. C. Priester and O. E. Harder* 436

Modern Furnaces and Heat Treating Methods—*E. F. Davis* 291
Mixtures of Hydrogen and Methane; Carburizing Iron by—*W. P. Sykes* 737

N

Neglected Phenomenon in Heat Treatment—*Birger Egeberg* 46
New Officers Nominated 529
News of the Chapters 143, 332, 528, 679, 841, 1007
News of the Society 141, 327, 512, 1003
Ninth Annual Convention 512
Nominated; New Officers 529
Normal and Abnormal Steel; Progress in Study of—
S. Epstein and H. S. Rawdon 337
Normality of Steel—*John D. Gat* 376
Notes on the Spark Testing of Steel—*George M. Enos* 976

O

Officers Nominated; New 529
On Grain Growth in Mild Steels—*Yap Chu-Phay* 601
On the Constitution and Properties of Hardened Steel—
W. P. Sykes and Dr. Zay Jeffries 871
On the Properties of Steels—*James E. Howard* 622
Oxide for Final Polishing and the Preservation of Polished and Etched Surfaces; Preparation of Aluminum—*W. P. Fishel* 982

P

Patents, Reviews of Recent 126, 307, 492, 667, 830, 986
Phenomenon in Heat Treatment; A Neglected—*Birger Egeberg* 46
Piercing; Forging Machine Die Design for Deep—*E. R. Frost* 954
Plug Gages; Recent Experiments Relating to the Wear of—
H. J. French and H. K. Herschman 921
Polished and Etched Surfaces; Preparation of Aluminum Oxide for Final Polishing and the Preservation of—*W. P. Fishel* 982
Polishing and the Preservation of Polished and Etched Surfaces; Preparation of Aluminum Oxide for Final—*W. P. Fishel* 982
Polishing Machine; A Metallographic—
Orlando E. Romig and J. C. Whetzel 235
Preparation of Aluminum Oxide for Final Polishing and the Preservation of Polished and Etched Surfaces—*W. P. Fishel* 982
Preservation of Polished and Etched Surfaces; Preparation of Aluminum Oxide for Final Polishing and the—*W. P. Fishel* 982
President's Annual Address 545
Press Comments on the Convention and Exposition 535
Principles Concerning Steel and Heat Treatment; Facts and—Part XIII—*H. B. Knowlton* 106
Principles Concerning Steel and Heat Treatment; Facts and—Part XIV—*H. B. Knowlton* 479
Principles Concerning Steel and Heat Treatment; Facts and—Part XV—*H. B. Knowlton* 814
Production Steels by Means of Salt Baths of Low Cyanide Concentration; Case Carburization of—*H. B. Northrup* 470

Progress in Study of Normal and Abnormal Steel—
S. Epstein and H. S. Rawdon 337
Properties and Heat Treatment of Cast Iron For Diesel Engines—
Francis B. Coyle 446
Properties of Hardened Steel; On the Constitution and—
W. P. Sykes and Dr. Zay Jeffries 871
Properties of Steel; Effect of Temperature on the Mechanical and Microscopic—*G. C. Priester and O. E. Harder* 436
Properties of Steels; On the—*James E. Howard* 622
Proportional Limit of Steel; Determining the—*Bengt Kjerrman* 41

R

Rails; Hair Cracks in Steel—*J. H. Whiteley* 208
Recent Experiments Relating to the Wear of Plug Gages—
H. J. French and H. K. Herschman 921
Recent Patents; Reviews of 126, 307, 492, 667, 830, 986
Relating to the Wear of Plug Gages; Recent Experiments—
H. J. French and H. K. Herschman 921
Relationships Between Rockwell, Brinell and Scleroscope Numbers—
R. R. Moore 968
Report; The Secretary's Annual 549
Report; The Treasurer's Annual 561
Research and its Application to Industry; The Development of Scientific —*T. McLean Jasper* 466
Resistance of Cutting Edges of Blanking Dies and Shear Blades; Wear—
W. J. Merten 195
Resisting Alloys; A Study of Some of the Causes of Failure in Heat—
Roger Sutton 221
Reviews of Recent Patents 126, 307, 492, 667, 830, 986
Rockwell, Brinell and Scleroscope Numbers, Relationships Between—
R. R. Moore 968

S

Salt Baths of Low Cyanide Concentration; Case Carburization of Production Steels by Means of—*H. B. Northrup* 470
Scientific Research and its Application to Industry; The Development of—
T. McLean Jasper 466
Scleroscope Numbers; Relationships Between Rockwell, Brinell and—
R. R. Moore 968
Secretary's Annual Report 549
Segregation of Dissolved Elements and Its Influence upon Carbon Distribution in Steel—*E. G. Mahin and H. J. Dillon* 905
Shear Blades; Wear Resistance of Cutting Edges of Blanking Dies and—
W. J. Merten 195
Sheet Steel; Testing Automobile Body—
Joseph Winlock and G. L. Kelley 635
Slow Bend Tests on High Speed Steel; Comparisons of Impact and—
R. K. Barry 630
Society; News of the 141, 327, 512, 1003
Some of the Causes of Failure in Heat Resisting Alloys; A Study of—
Roger Sutton 221

Spark Testing of Steel; Notes on the—*George M. Enos* 976
Steel; A Critical Study of the Bend Test as Applied to Iron and—
A. B. Kinzel 778
Steel; Comparisons of Impact and Slow Bend Tests on High Speed—
R. K. Barry 630
Steel; Deep Etch Test for Iron and—*H. G. Keshian* 689
Steel; Determining the Proportional Limit of—*Bengt Kjerrman* 41
Steel; Effect of Temperature on the Mechanical and Microscopic Properties of—*G. C. Priester and O. E. Harder* 436
Steel; Gas Carburization of—*R. G. Guthrie and Dr. O. J. Wozasek* 853
Steel; Normality of—*John D. Gat* 376
Steel; Notes on the Spark Testing of—*George M. Enos* 976
Steel; On the Constitution and Properties of Hardened—
W. P. Sykes and Dr. Zay Jeffries 871
Steel; Progress in Study of Normal and Abnormal—
S. Epstein and H. S. Rawdon 337
Steel; Segregation of Dissolved Elements and Its Influence upon Carbon Distribution in—*E. G. Mahin and H. J. Dillon* 905
Steel; Testing Automobile Body Sheet—
Joseph Winlock and G. L. Kelley 635
Steels; The Decomposition of the Austenitic Structure in Steels—Part VI—*Oscar E. Harder and Ralph L. Dowdell* 51
Steels; Heat Treatment of Two Ball Bearing—*Bengt Kjerrman* 759
Steels; On Grain Growth in Mild—*Yap Chu-Phay* 601
Steels; On the Properties of—*James E. Howard* 622
Steel and Cast Iron; The Constitution of—Part X—*F. T. Sisco* 279
Steel and Cast Iron; The Constitution of—Section II—Part I—
F. T. Sisco 651
Steel and Heat Treatment; Facts and Principles Concerning—Part XIII—*H. B. Knowlton* 106
Steel and Heat Treatment; Facts and Principles Concerning—Part XIV—*H. B. Knowlton* 479
Steel and Heat Treatment; Facts and Principles Concerning—Part XV—
H. B. Knowlton 814
Steel in the Synthesis of Ammonia; Deterioration of Structural—
J. S. Vanick 169
Steel Rails; Hair Cracks in—*J. H. Whiteley* 208
Structural Steel in the Synthesis of Ammonia; Deterioration of—
J. S. Vanick 169
Structure in Steels; The Decomposition of the Austenitic—Part VI—
Oscar E. Harder and Ralph L. Dowdell 51
Study of the Bend Test as Applied to Iron and Steel; A Critical—
A. B. Kinzel 778
Study of Normal and Abnormal Steel; Progress in—
S. Epstein and H. S. Rawdon 337
Study of Some of the Causes of Failure in Heat Resisting Alloys—
Roger Sutton 221
Surfaces; Preparation of Aluminum Oxide for Final Polishing and the Preservation of Polished and Etched—*W. P. Fishel* 982
Synthesis of Ammonia; Deterioration of Structural Steel in the—
J. S. Vanick 169

T

Temperature on the Mechanical and Microscopic Properties of Steel; Effect of—*G. C. Priester and O. E. Harder* 436
Test as Applied to Iron and Steel; A Critical Study of the Bend—*A. B. Kinzel* 778
Test for Iron and Steel; Deep Etch—*H. G. Keshian* 689
Testing Automobile Body Sheet Steel—*Joseph Winlock and G. L. Kelley* 635
Testing of Steel; Notes on the Spark—*George M. Enos* 976
Tests on High Speed Steel; Comparisons of Impact and Slow Bend—*R. K. Barry* 630
Treasurer's Annual Report 561
Treating Methods; Modern Furnaces and Heat—*E. F. Davis* 291
Treating Standpoint; Design from the Heat—*G. M. Eaton* 794
Treatment; Facts and Principles Concerning Steel and Heat—Part XIII—*H. B. Knowlton* 106
Treatment; Facts and Principles Concerning Steel and Heat—Part XIV—*H. B. Knowlton* 479
Treatment; Facts and Principles Concerning Steel and Heat—Part XV—*H. B. Knowlton* 814
Treatment; A Neglected Phenomenon in Heat—*Birger Egeberg* 46
Treatment of Cast Iron for Diesel Engines; Properties and Heat—*Francis B. Coyle* 446
Treatment on the Combined Carbon in Gray Cast Iron; Effect of Heat—*E. L. Roth* 27
Treatment of Two Ball Bearing Steels; Heat—*Bengt Kjerrman* 759
Two Ball Bearing Steels; Heat Treatment of—*Bengt Kjerrman* 759

V

Vanadium Alloy for Brinell Balls; Iron-Carbon—*G. W. Quick and L. Jordan* 3

W

Wear of Plug Gages; Recent Experiments Relating to the—*H. J. French and H. K. Herschman* 921
Wear Resistance of Cutting Edges of Blanking Dies and Shear Blades—*W. J. Merten* 195

AMERICAN SOCIETY *for* STEEL TREATING

The object of the Society shall be to promote the arts and sciences connected with either the manufacture or treatment of metals, or both.—Constitution A. S. S. T., Art. II.

Officers and Board of Directors

J. FLETCHER HARPER, President
Allis-Chalmers Mfg. Co.
Milwaukee

F. G. HUGHES, Vice-President
New Departure Mfg. Co.
Bristol, Conn.

W. H. EISENMAN, Secretary
7016 Euclid Avenue
Cleveland

DR. ZAY JEFFRIES, Treasurer
Aluminum Company of America
Cleveland

DIRECTORS

R. M. BIRD, Past-President
709 Beacom Lane
Merion Station, Pa.

R. G. GUTHRIE
People's Gas Light and Coke Co.
Chicago

L. D. HAWKRIDGE
Hawkridge Bros. Company
Boston, Mass.

HYMAN BORNSTEIN
Deere & Co.
Moline, Ill.

J. H. NEAD
American Rolling Mill Company
Middletown, Ohio

FOUNDER MEMBERS

THEODORE E. BARKER, Oak Park, Ill.
*ARTHUR G. HENRY, Chicago
WILLIAM P. WOODSIDE, Detroit

HONORARY MEMBERS

CHARLES F. BRUSH, Sc. D. ..... Cleveland
*EDWARD DEMILLE CAMPBELL ..... Ann Arbor, Mich.
HENRY LE CHATELIER ..... Paris, France
*JUDGE ELBERT H. GARY ..... New York City
SIR ROBERT HADFIELD, Bart., F.R.S. ..... London, England
*ELWOOD HAYNES ..... Kokomo, Ind.
KOTARO HONDA, Sc. D. ..... Sendai, Japan
*HENRY MARION HOWE, Sc. D. ..... New York City
CHARLES F. KETTERING ..... Detroit
JOHN ALEXANDER MATHEWS, Sc. D. ..... New York City
ALBERT SAUVEUR, Sc. D. ..... Cambridge, Mass.
CHARLES M. SCHWAB ..... New York City
WILLIS R. WHITNEY, Ph. D. ..... Schenectady

HENRY MARION HOWE MEDALISTS

EMANUEL J. JANITZKY 1922
FRANCIS F. LUCAS 1924
HORACE H. LESTER 1925
FREDERICK C. LANGENBERG 1926
WESLEY P. SYKES 1927

PAST PRESIDENTS

ALBERT E. WHITE 1921
FRANK P. GILLIGAN 1922
TILLMAN D. LYNCH 1923
GEORGE K. BURGESS 1924
WILLIAM S. BIDLE 1925
ROBERT M. BIRD 1926

*Deceased.